Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

32
Ag 82
(Supp)

AIC-188
Supplement 6
February 15, 1951

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY

LIST OF PUBLICATIONS AND PATENTS
of the
Southern Regional Research Laboratory
2100 Robert E. Lee Boulevard
New Orleans 19, Louisiana

July - December 1950

CONTENTS

Articles and Addresses: Page

Apparatus, Analytical Methods, and Techniques 2

Cotton and Cotton Products 4

Cottonseed, Peanuts, Rice, and Other Oilseeds 9

Sweetpotatoes 19

Press Notices 19

Patents 20

Republications 21

LIBRARY
CURRENT SERIAL RECORD
MAY 3 - 1951
U. S. DEPARTMENT OF AGRICULTURE

Single copies of available reprints may be obtained upon request. Copies of patents are not distributed. They may be purchased from the U. S. Patent Office, Washington, D. C.

ARTICLES AND ADDRESSES

No.

Apparatus, Analytical Methods, and Techniques

1 BUDOWSKI,* Pierre, O'Connor, R. T., and Field, E. T.

SESAME OIL. IV. DETERMINATION OF FREE AND BOUND SESAMOL. Amer. Oil Chem. Soc. Jour. 27(8): 307-310. 1950.

A spectrophotometric method for the determination of free and bound sesamol, based on the Villavecchia test, is described. Furfural, in the presence of aqueous sulfuric acid, proved the most suitable reagent for applying the Villavecchia test. It was possible to distinguish between free and bound sesamol by dissolving a sample of oil iso-octane; extracting with a dilute solution of aqueous alcoholic alkali in which the free, but not the bound, sesamol is soluble; and then applying the modified Villavecchia test to the original oil solution, the alkali-extracted oil solution, and the alkaline extract. The intensities of the colors produced with the three solutions correspond to the total, bound, and free sesamol, respectively, that was originally present in the oil. Agreement between the total and the free plus the bound sesamol in crude, refined, bleached, and deodorized samples of oil was close. Four crude oils of different origins had total sesamol ranging from 0.13 to 0.17 percent of which nearly all was bound. Yields of added sesamol varied from 95 to 106 percent. The method has proved useful in studies of the stability of sesame oil.

2 HOFFPAUIR, Carroll L.

REPORT ON STARCH IN PLANTS. Assoc. Off. Agr. Chem. Jour. 33(3): 810-815. 1950.

The Pucher, Leavenworth, and Vickery method for the determination of small amounts of starch in plants and also a modification involving the use of calcium chloride solution instead of perchloric acid were investigated. Each step in the two procedures was verified. Samples of cotton root bark, orange rind, cottonseed meal, and Jerusalem artichoke previously reported on were analyzed by the two methods. Both the perchloric acid extraction and the calcium chloride extraction gave values which were reasonable in view of what was known about the samples. The presence of pectin, inulin, raffinose or protein did not interfere, and satisfactory recoveries were obtained on known amounts of starch. These methods therefore meet the requirements for the determination of low percentages of starch in plant material.

---

*Rockefeller Foundation Fellow from the Ministerio do Agricultura y Cria, Division do Quimica, El Valle, D. F. Venezuela.

No.

3 HOGAN, Joseph T.

NOMOGRAPH— CALCULATION OF THE DEGREE OF ELONGATION OF FIBER DURING ITS PREPARATION. Amer. Dyestuff Rptr. 39(22) 725. 1950.

A nomograph for calculating the degree of elongation of peanut protein fiber during its preparation is presented, and the theory and method of construction and use of the nomograph are explained.

4 LOHMANN, Idas W.

AN ELECTRONIC RECORDING ANALYTICAL BALANCE. Rev. Sci. Instruments 21(12): 999-1002. 1950.

An electronic recording balance which is free of mechanical contact with the balance beam was designed for measuring the changes in weight with time which take place in substances owing to the loss of volatile constituents. The instrument is sensitive and rapid and is simply constructed since commercially available units are used for the greater part. A range extender permits measuring and recording changes in weight up to 11.1 grams.

5 PONS, Walter A., Jr., Hoffpauir, Carroll L., and O'Connor, Robert T.

DETERMINATION OF TOTAL GOSSYPOL PIGMENTS IN COTTONSEED MATERIALS. Amer. Oil Chem. Soc. Jour. 27(10): 390-393. 1950.

A method for the determination of total gossypol pigments in cottonseed materials is described which involves an acid hydrolysis of the "bound" gossypol pigments in aqueous methyl ethyl ketone, and the colorimetric determination of the gossypol pigments by the method described by Pons and Guthrie (see List for July-December 1949, Item No. 23) for free gossypol pigments. The conditions for hydrolysis have been investigated for various types of cottonseed materials and data are presented on the recovery of gossypol added to such materials. Spectrophotometric data indicate that the pigments in the hydrolyzates are gossypol and closely related pigments and that the conditions specified do not alter them.

6 RUSCA, Ralph A.

CONVERSION OF THE SACO-LOWELL SLIVER TESTER TO ELECTRICAL RECORDING. Textile Res. Jour. 20(11): 780-786. 1950.

The usual recording chart of a Saco-Lowell sliver tester has been replaced by a series of electrical contacts over which the recording arm passes in accordance with the thickness of the sliver. The

No.

instrument is described, illustrated, and the theory and mechanics involved in its construction are discussed. The converted sliver tester has been used successfully at the Southern Regional Research Laboratory for more than a year in textile research applications.

7 STARK, S. M., Jr.

DETERMINATION OF PECTIC SUBSTANCES IN COTTON. COLORIMETRIC REACTION WITH CARBAZOLE. Analyt. Chem. 22(9): 1158-1160. 1950.

A colorimetric method for the determination of pectic materials in cotton is described. It involves the extraction of the pectic substances from the cotton and the reaction of the resultant pectic acid solution with sulfuric acid and alcoholic solution of carbazole to give a colored solution. A quantitative value is obtained by photometric comparison of the color developed by the sample with that of a series of standards made with galacturonic acid monohydrate. The result is expressed as percentage of anhydro-galacturonic acid, the basic group in the pectic polyuronide.

Cotton and Cotton Products

8 DEAN, J. D., Berard, W. N., and Worner, R. K.

EFFECT OF WEATHER ON BLEACHED AND UNBLEACHED COTTON DUCK. Textile Res. Jour. 20(9): 643-649. 1950.

Six replicate sets of bleached and unbleached samples of cotton duck were exposed for 1 year in New Orleans, placed outside at 2-month intervals from December through October. Results showed that the gray cloth varied more in breaking strength but that fluidity variations in both types of cloth were similar. The averaged copper number of both gray and bleached fabrics increased fairly uniformly, that of the bleached fabrics after the first 2 months remaining consistently the higher. For gray and bleached cloth copper number-fluidity relationships were practically linear.

No.

9 DOCKRAY,* George H., Meadows, Barkley, and Smith,**Leonard

COTTON WASTE. Textile Res. Jour. 20(10): 684-718. 1950.

To present information on the size and the nature of the cotton waste industry, on the factors influencing waste markets, on methods for controlling waste, and to point out opportunities for progress in this field through research is the objective of this report. In 1948, in the United States the 642 million pounds of cotton waste produced had a value at the mill of $71,000,000. The average carded yarn mill removes as waste about 15 percent of the raw cotton; the average combed yarn mill about 30 percent. About 70 percent of waste is fiber, the rest motes, bits of leaf and stem, dust, and similar foreign matter. About 13 percent of total waste is used in the mill; the remainder sold to a dealer; prices ranging (in 1948) from less than 1 cent per pound to as much as 24 cents. In a typical carded yarn mill (in 1948) raw material eliminated as waste cost about 4.5 cents per pound of cotton processed, not counting labor. Cleaned cotton waste is spun alone or used in blends with raw cotton or other fibers. In end uses competition is principally with cotton and cotton linters. Uses include, as examples, mattress felts, stuffing for toys, mop yarns, tobacco shade cloth. Many cotton mills are improving the efficiency of handling and sorting techniques to keep waste at the minimum consistent with high quality and smooth operation. Research to improve the separation of fiber from the other waste ingredients, to reduce the amount of fiber removed as waste, and to improve mill testing and control measures should benefit the textile industry.

10 FISHER, C. H.

RESEARCH IS AIDING COTTON MILLS. South. Textile News 6(43): 5. 1950.

Research conducted at the Southern Regional Research Research Laboratory in an effort to aid cotton mills in improving their products has included in the past few years: the preparation of a new draft guide for use with the high-draft type of roving frame; development of a novel cotton-bale opener and of a new-type slasher; development of a simple dye test to distinguish mature from immature fibers and of a simple chemical test to detect the presence of honeydew on cotton lint. In cotton-fiber and cotton chemical finishing research have been developed fabrics which have ion-exchange abilities; yarns which dissolve on being washed in soapy water, yet are strong enough to be woven; fabrics with improved weather resistance, rot resistance, water absorbency, or soiling resistance. These activities are helping cotton to meet competition.

*Technical Service Department, National Cotton Council of America, Washington, D. C.

**Director of Utilization Research, National Cotton Council of America, Washington, D. C.

No.

11 GOLDTHWAIT, Charles F., and Smith, Herbert O.

CALIFORNIA'S NEW COTTON SHOWS BIG IMPROVEMENT. Textile World 100(9): 127,310,312,314,316. 1950.

California's 1949 acreage of cotton was planted in a new Acala cotton, known as 4-42. Some of the advantages which this cotton had over Acala P-18-C were demonstrated in tests of sample bales carried out at the Southern Regional Research Laboratory in co-operation with the School of Textiles of North Carolina State College. Single samples cannot be taken as necessarily representing typical cottons of their varieties for another year, but the results indicate the direction of development of California cotton. In the cloth made from the 4-42 cotton the number of neps was reduced by nearly one-half; and strength of the fiber, yarn, and cloth was consistently greater than for the Acala P-18-C or for a sample of a rain-grown Deltapine 14. The 4-42 sample cotton was also better adapted to mercerization than the Acala P-18-C; and this process performed ahead of dyeing caused the neps to color normally.

12 GUTHRIE, John D., and Reeves, Wilson A.

DEMONSTRATION OF THE PRESENCE OF A GALACTO-ARABAN IN RAW COTTON FIBER. Textile Res. Jour. 20(12): 859-861. 1950.

When an aqueous extract of raw cotton fiber was deionized, evaporated under reduced pressure, and precipitated with ethanol, the precipitated material contained a galacto-araban, since galactose and arabinose were the principal sugars in the hydrolyzate, as was demonstrated by paper chromatography. Galactose was verified by formation of mucic acid and arabinose by the formation of its diphenyl-hydrazone, the derivatives being indentified by their x-ray diffraction patterns.

No.

13 HEINZELMAN, D. C., and O'Connor, R. T.

TRACE METALS IN COTTON FIBER. Textile Res. Jour. 20(11): 805-807. 1950.

A spectrochemical method based on the line-width technique was devised in order to provide compositional data on the presence of trace metals in cotton which are known to catalyze the degradation of cellulose. The method was applied to the cotton lint of 8 varieties grown in one location and to one variety grown in 13 locations. Its precision and accuracy were tested. The highest, lowest, and average parts per million, calculated on a moisture-free basis, for copper were 4.01, 0.68, and 1.57; for iron 15.77, 5.74, and 9.03; and for manganese 12.39, 2.79, and 6.92. Though some variation is attributed to varietal characteristics, greater variation is caused by soil environment. The spectrograms indicated the presence of traces of aluminum, boron, and zinc, but did not reveal the presence of chromium, nickel, or tin.

14 HOFFPAUIR, Carroll L., and Guthrie, John D.

ION-EXCHANGE CHARACTERISTICS OF CHEMICALLY MODIFIED COTTON FABRICS. Textile Res. Jour. 20(9): 617-620. 1950.

The pH at which an ion-exchanger exhibits half its maximum capacity corresponds to the half-neutralization point of the exchanger and is a means of rating ion-exchangers independent to their capacity. The variation in the ion-exchange capacity of a number of chemically modified cotton fabrics as a function of pH was determined. Phosphorylated cotton fabric behaved as a dibasic acid with acid strength comparable to that of the first and second hydrogen of phosphoric acid. Partially sulfethoxylated cellulose was a cation-exchanger of high acid strength while carboxymethylated cellulose and the succinic acid half ester of cellulose were weakly acidic cation-exchangers. Aminoethyl cellulose, a primary amine, and diethyl aminoethyl cellulose, a tertiary amine, were weakly basic anion-exchangers. Treatment of diethyl aminoethyl cellulose with methyl iodide gave a quartenary compound which served as an anion-exchanger of high basic strength.

No.

15 KIME, James A.

INTRODUCING NEW COTTON PRODUCTS. Eleventh Cotton Research Congress, Proc., July 27-28, 1950, Dallas, Texas, pp. 87-93.

The application of research to improve the competitive position and widen the utilization of cotton is illustrated by the development of superior heat- and rot-resistant cotton by a process of acetylation; the production of a new soluble cotton yarn; the treatment of cotton bagging with small amounts of pyrethrin to repel insects; the possibility of making attractive dresses, slip covers, and other products out of low-priced osnaburg finished by modern processing procedures; and the use of a new loom attachment to produce dense, tightly woven fabrics with superior resistance to wind and rain. Another example is a discovery made at the Institute of Textile Technology, Charlottesville, Virginia, in research performed by contract for the Department of Agriculture: that cotton goods resist soiling better and wash easier when carboxymethyl cellulose is used in the rinse water.

16 MOORE, Anna T., Scott, Lorraine W., deGruy, Ines V., and Rollins Mary L.

THE SWELLING OF COTTON IN WATER: A MICROSCOPICAL STUDY. Textile Res. Jour. 20(9): 620-630. 1950.

A method is described for comparing microscopically the cross-sectional areas of the same cotton fiber in wet and dry conditions for evaluation of swelling. Results indicated a change in cross-sectional area of raw cotton fibers of between 24 and 33 percent of the dry area regardless of variety or degree of maturity. Immature samples showed slightly less mean swelling than mature samples, but this was believed due to the presence of "dead" fibers. Immature showed slightly more deformation -- change in circularity -- than mature fibers. This tendency and the fact that there are about twice as many fibers in a given weight of immature as in a like weight of mature fibers, helps to explain the greater closing capacity of yarns made from immature cotton. Flax and a sample of viscose rayon showed twice the swelling of cotton, Fortisan 2/3 as much, and nylon no cross-sectional swelling at all.

No.

17 REEVES, Richard E., Mazzeno, Laurence W., Jr., and Hoffpauir, Carroll L.

THE HETEROGENEOUS METHANOLYSIS OF NATIVE AND MERCERIZED COTTON CELLULOSE. Amer. Chem. Soc. Jour. 72(10): 4773-4777. 1950.

The methanolysis of cotton cellulose produces two measurable results: introduction of acid-labile methoxyl groups into the insoluble phase and dissolution of a portion of the cellulosic material into the methanolysis reagent. When methanolysis is considered as the sum of these two effects it is found that the rate of methanolysis smoothly decreases in the region where 0.1 to 5 percent of the glucose units have undergone reaction. Throughout this investigated region the temperature coefficient for native cotton cellulose remained constant; for mercerized, a lower, essentially constant value was observed. It appears that the rate controlling step in methanolysis involves, at a single step, the rupture of secondary as well as primary valence forces. The data are explicable in terms of reaction with an initially large crystalline surface, diminishing strongly as the surface is reduced by the coalescence of crystalline areas when internal tensions relax due to reaction within the fiber.

18 REID, J. David, Daul, George C., and Reinhardt, Robert M.

THE PREPARATION OF WATER- AND ALKALI-SOLUBLE COTTON YARNS. [In Letters to the Editor.] Textile Res. Jour. 20(9): 657-659. 1950.

Press reports confused two types of soluble yarns produced at the Southern Regional Research Laboratory. This Letter to the Editor differentiates between alkali-soluble metal carboxymethylcellulose fibers previously described (see List for July-December 1949, Item No. 6) and the new water- or alkali-soluble modified cotton yarns. A typical method of preparation of the latter is described.

See also Items Nos. 6, and 7.

Cottonseed, Peanuts, Rice, and Other Oilseeds

19 ALTSCHUL, A. M.

RESEARCH INVESTIGATION ON RICE AT THE SOUTHERN REGIONAL RESEARCH LABORATORY. The Rice Jour. 53(12): 25-29. 1950.

The production of rice in the United States doubled between 1934 and 1949, and could be further increased if markets were available at satisfactory prices. Uncertain foreign markets and increased competition in domestic outlets from other sources of

No.

carbohydrates are a major problem in maintaining the high level of production. Expansion of the present uses of rice and the development of new uses are two avenues open to increase the utilization of rice. Research at the Southern Regional Research Laboratory includes work on the problems of rice bran storage and on milling difficulties arising from the deterioration of rice in storage. This research is coordinated through the Rice Technical Committee with work being conducted on rice by state and other government agencies.

20 ARTHUR, Jett C., Jr., and Many, Hugh G.

PEANUT PROTEIN FIBERS--PILOT SCALE PLANT. Amer. Dyestuff Rptr. 39(22): 719-722. 1950.

The construction and operation of a pilot-scale fiber spinning plant are described and typical operating data for the plant when used to prepare peanut protein fibers are presented. The fiber production capacity of the plant may be easily varied from 50 to 800 grams of fiber per hour per spinnerette, applying a stretch of 200 to 1,500 percent to the fiber during its preparation. Fibers produced with this machine have tensile strengths of 0.86 grams per denier and have been successfully knitted.

21 ARTHUR, Jett C., Jr., and Saik, Barbara H.

INTRINSIC VISCOSITY OF COTTONSEED GLOBULIN SOLUTIONS. Jour. Colloid Sci. 5(4): 326-330. 1950.

The shape characteristics of cottonseed globulin molecules in solution as determined by viscosity data are important in adapting the globulin for use in making synthetic fibers or adhesives and in evaluating chemical and physical modification of the globulin. Globulin (18.06 percent nitrogen) was extracted from solvent-extracted cottonseed meal by means of 0.5 M sodium chloride solution, precipitated by dialysis, and lyophilized. The intrinsic viscosity of the globulin in urea solutions was calculated to be 0.093, equivalent to a viscosity increment of 12.3 and an axial ratio (Simha equation) of 9.4 assuming elongated macromolecules or of 16.3 assuming flattened-disc-type macromolecules.

No.

22 BUDOWSKI* Pierre

SESAME OIL. III. ANTIOXIDANT PROPERTIES OF SESAMOL. Amer. Oil Chem. Soc. Jour. 27(7): 264-267. 1950.

The work of several investigators of sesamin and sesamol is reviewed. The procedure used to obtain sesamolin, together with sesamin, and a phytosterol as byproduct, is described. Data on the antioxidant activity of sesamol in lard and in peanut, cottonseed, and sesame oils are tabulated. Sesamol had marked antioxidant activity in lard and was appreciably active in the three vegetable oils, especially in sesame oil. This antioxidant activity strengthens the assumption that free sesamol is responsible for the unusual stability of hydrogenated sesame oil. Although usually present in a bound form (sesamolin), sesamol is known to be liberated by the action of even dilute mineral acids. Sesamol is a very low molecular weight compound and is volatile enough to be removed by deodorization; so should be added to the fat after deodorization. The presence of sesamol in concentrations up to 0.2 percent in sesame oil would probably indicate that no serious adverse physiological problem exists with respect to use of sesamol as a commercial antioxidant.

23 BUDOWSKI* Pierre, Menezes** F. G. T., and Dollear, F. G.

SESAME OIL. V. THE STABILITY OF SESAME OIL. Amer. Oil Chem. Soc. Jour. 27(10): 377-380. 1950.

Four sesame oils of different origins were refined, bleached, and deodorized, and the A.O.M. stability of each was determined. A correlation was found between the stability and the free sesamol content. Bleaching increased both values. In one oil (bleached with "neutral clay") stability was as high as 56 hours. Deodorization removed the free sesamol and reduced stability to about 10 hours. Stabilities of bleached oils after hydrogenation to shortening consistency ranged from 560 to 840 hours, with free sesamol of about 0.1 percent. Deodorization removed the free sesamol with a reduction in stability to 380-540 hours. Hydrogenation produced a progressive liberation of sesamol with only a slight decrease in total sesamol. When shortening consistency was reached practically all the sesamol was in a free form. A positive result with the Emmerie-Engel test for tocopherols but not with the Furter-Meyer test is probably attributable to the presence of sesamol rather than to that of tocopherols.

---

*Rockefeller Foundation Fellow from the Ministerio de Agricultura y Cria, Division de Quimica, El Valle, D. F., Venezuela.

**Trainee, Government of Madras, India.

No.

24 CASTILLON, Leah E., and Altschul, A. M.

PREPARATION OF WATER-SOLUBLE COMBINATION PRODUCTS OF GOSSYPOL AND THEIR TOXICITY TO AQUARIUM FISH. Soc. Expt. Biol. and Med. Proc. 74(3): 623-626. 1950.

The purpose of this investigation was to make combination products of gossypol with naturally occurring materials which would have physical properties different from those of the original material and to determine the effect of such changes on some physiological actions of gossypol. Gossypol was tested on aquarium goldfish and sharp differences in physiological activity between the original gossypol and the combination products were obtained. Gossypol was combined with proteins, amino acids, and carbohydrates, to produce materials that were soluble or dispersible in water or buffer solutions at pH 7.0 by mixing gossypol and the other material in aqueous solution at alkaline pH, neutralizing that mixture, and drying by lyophilization. These water-soluble products were lethal to goldfish at concentrations as small as 1 part in 100,000 parts of water. An aqueous solution of gossypol-peanut protein maintained its toxicity and its original gossypol content for at least 48 hours. Cottonseed pigment glands were shown to be less toxic than the gossypol combination complexes. Crystalline gossypol, when added to the aquarium bath, displayed no visible toxic effects on the goldfish.

25 DECOSSAS, Kenneth M., Deckbar, Frederick A., Jr., and Hecker, Joseph L.

DENSITIES AND GRAVITIES OF COTTONSEED AND PEANUT OIL MISCELLAS IN ENGLISH UNITS. AIC-292, (Processed.) 1950.

Data in the literature on density-temperature-constant composition parameters for refined and winterized cottonseed oil-commercial hexane miscellas and for refined winterized peanut oil-commercial hexane miscellas are replotted in English Units; namely, densities in pounds per cubic foot and per gallon, and temperatures in degrees Fahrenheit. The specific gravities are calculated on a basis of the density of water at 60° F. These plots complement those previously published (see List for January-June 1950, Item No. 12) in English units on boiling points of cottonseed and peanut oil miscellas. Replotting these data will render them more useful and suitable for design calculations, plant operations, and interpretations of operating data.

No.

26 EAGLE,* Edward, Hall, Catherine M., Castillon, Leah E., and Miller, Charlotte Boatner

EFFECT OF FRACTIONATION AND TREATMENT ON THE ACUTE ORAL TOXICITY AND ON THE GOSSYPOL AND GOSSYPURPURIN CONTENT OF COTTONSEED PIGMENT GLANDS. Amer. Oil Chem. Soc. Jour. 27(8): 300-303. 1950.

The acute oral toxicity in rats of a number of cottonseed pigment gland preparations and of pure gossypol was determined. No correlation was found between the toxicity of the various samples of glands and their extractable gossypol or gossypurpurin content. Fractions of glands were prepared and tested for toxicity. A water- and acetone-soluble fraction was more toxic than the original glands; but an acetone-insoluble residue had practically no toxicity. Dry heating had no apparent effect on the toxicity of the pigment glands, whereas heating in the presence of water markedly decreased their toxicity. Toxicity of pigment glands decreased with the length of time the original seed had been stored. There was no apparent change in toxicity when separated glands were stored except in those which were obtained from cottonseed which had first been defatted with hexane. The acute oral toxicity of pure gossypol in rats was less than that for preparations of glands which had extractable gossypol contents ranging from as little as 24 to 90 percent. These results confirm a previous conclusion that the toxicity of cottonseed pigment glands is attributable either to some component or components of the glands other than, or in addition to, gossypol, or to one which enhances the activity of gossypol.

27 HEYWANG,** Burt W., Bird,** H. R., and Altschul, A. M.

THE EFFECT OF PURE GOSSYPOL ON EGG HATCHABILITY AND WEIGHT. Poultry Sci. 29(6): 916-920. 1950.

High hatchability was the basis of selecting 10 White Leghorn pullets for each of 4 experimental groups for feeding tests. One group was fed the diet with no gossypol and the others the diet in which pure gossypol was mixed at the .012, .024, and .036 percent levels. The mixed diets were fed only on the day of mixing and the following day. Gossypol had an appreciable adverse effect on hatchability and egg weight when it was mixed with the diet at the .024 percent level and a still greater adverse effect at the .036 percent level, but did not affect either at the .012 percent level. Hatchability and egg weight returned to normal after gossypol feeding was stopped.

*Research Laboratories, Swift and Company, Chicago, Illinois.

**Bureau of Animal Industry.

No.

28 HOFFPAUIR, Carroll L., Poe,* Sam E., Wiles,* L. U., and Hicks,* Martha

GERMINATION AND FREE FATTY ACIDS IN SEED STOCK LOTS OF COTTONSEED. Amer. Oil Chem. Soc. Jour. 27(9): 347-348. Also published in The Cotton Gin and Oil Mill Press 51(22): 30-31; The Cotton Digest 28(7): 28; Oil Mill Gazetteer 55(5): 13-14. 1950.

Examination of 254 samples of cottonseed, representing 16 varieties, indicated that the percentage of free fatty acids in the extracted oil may be used as an index for selecting lots to be reserved for seeding purposes. The percentage of germination decreased, on the basis of averages, with increasing free fatty acid content. The probability that a given lot of seed will exceed a specified minimum germination value decreases markedly as the free fatty acid value increases. The data allow such probabilities to be estimated from the free fatty acid values and suggest that cottonseed reserved for seeding, insofar as practical, have a low free fatty acid content, less than 0.75 percent in the oil.

29 HUSSAIN,** S. A., and Dollear, F. G.

CHARACTERISTICS OF SOLVENT-EXTRACTED AND HYDRAULIC-PRESSED OKRASEED OILS. Amer. Oil Chem. Soc. Jour. 27(8): 295-300. 1950.

The production, characteristics, composition, and stability of solvent-(commercial hexane-) extracted hydraulic-pressed okraseed oils and their hydrogenated products were compared. The okraseed was of the Louisiana Green Velvet variety, grown in Louisiana in 1947. Solvent-extracted okraseed oil gave a very low refining loss and the refined and bleached oil was light-colored oil (10 yellow and 1.0 red, bleached with 4 percent acid-activated earth). The hydraulic-pressed oil had a higher refining loss, a higher free fatty acid content, and when refined and bleached the lowest color obtained was 35 yellow and 4.3 red Lovibond units. After deodorization the color was 35 yellow and 2.2 red. The two oils were hydrogenated to different iodine values at 15 p.s.i. pressure, 250° F., with 0.1 percent nickel catalyst. The calculated composition based on spectrophotometric measurements was not in agreement with that calculated from iodine and thiocyanogen values; however, repeated isomerizations

*Arkansas State Plant Board, Little Rock, Arkansas.

**State of Hyderabad, India.

and measurements gave fairly good agreement with values obtained by chemical methods. Stabilities of the refined, bleached, and hydrogenated oils were somewhat lower than those of cottonseed or peanut oils of comparable iodine values. The studies indicate that solvent-extracted and hydraulic-pressed okraseed oil can be used in edible products.

30 MAGNE, Frank C., Huges, Edwin J., and Skau, Evald L.

DENSITY-COMPOSITION DATA FOR COTTONSEED OIL-SOLVENT MIXTURES. Amer. Oil Chem. Soc. Jour. 27(12): 552-555. 1950.

Density-composition-temperature data are reported for binary systems of a refined cottonseed oil with methyl pentane, diethyl ether, trichloroethylene, and tetrachloroethylene over a wide temperature range -- from the point of incipient phase separation to within 10° to 15° C. of the boiling point of the solvent. These data can be used to calculate the density knowing the composition and temperature or, conversely, the composition knowing the density and the temperature. An equation has been derived which makes it possible to adjust these data so that they apply with reasonable accuracy to other refined and crude cottonseed oils and even to soybean or peanut oil systems with the same solvents.

31 MORRIS, Nelle J., Swift, C. E., and Dollear, F. G.

RICE BRAN OIL. VII. THE "FINES" FRACTION OF RICE BRAN. The Rice Jour. 53(9): 6-7, 10. 1950.

Rice bran has been subjected to sieve analyses and the oil content of the various fractions as a function of particle size has been determined. The "fines" produced during pilot-plant extraction of rice bran consisted of 67.5 percent of material that will pass a 400-mesh sieve. Data indicated that the tendency of fines to become suspended in the miscella is dependent appreciably on the moisture content of the bran, fewer fines passing into the miscella when bran of 15.6 percent moisture was extracted with commercial hexane. Increasing the moisture content to about 16 percent had no adverse effect on the yield of oil recovered by solvent extraction.

32 PERSELL, R. M., Pollard, E. F., and Gastrock, E. A.

PROBLEMS AND PROGRESS IN THE SOLVENT EXTRACTION OF COTTONSEED. Cotton Gin and Oil Mill Press 51(26): 9-11, 24-25, 30-32. 1950.

The introduction of solvent extraction to the cottonseed industry has made possible a higher recovery of the oil and the production of a meal which is highly nutritious for expanded animal

No.

and human consumption as well as being a potential source of industrial proteins. But many complex economic and technological problems must be solved before the full theoretical advantage of the process can be realized. Some of these problems are being worked out in commerical plants and others in research laboratories. The scope and importance of these problems in these times of rapid technological advances and increasingly competitive conditions make this a fertile field for research.

33 PERSELL, R. M., Vix, H. L. E., Reuther, C. G., and Pollard, E. F.

PILOT-PLANT FRACTIONATION OF COTTONSEED. V. A PRELIMINARY COST STUDY. Amer. Oil Chem. Soc. Jour. 27(10): 383-386. 1950.

A preliminary cost study of a proposed combination screw-press-fractionation plant showed that the economic advantage of the combination plant over the screw-press operation is small in comparison with the large additional investment that would be required for the combination plant. The present value of the combination process lies in the production of two new products -- a purified high-protein meal and a concentrated pigment gland fraction -- and in the possibility of producing a high-grade oil by the removal of the whole pigment gland, as is done in the fractionation process. Pilot-plant work under way indicates improvements in the fractionation process such as a higher recovery of still more improved meal.

34 SINGLETON, W. S., and Freeman, A. F.

EXPANSIBILITY AND SPECIFIC VOLUME OF STABILIZED AND UNSTABILIZED PEANUT BUTTER. Food Res. 15(4): 297-301. 1950.

Peanut butter of three different compositions was subjected to dilatometric examination. From the data on expansibility and absolute density, the absolute specific volume of each peanut butter was calculated for various temperatures from -38.6° to 70.0° C. No evidence of polymorphic transformations was obtained regardless of rates of cooling of the samples. The reported data may be applied to the calculation of the shrinkage of peanut butter which may occur after packaging as a result of natural cooling of the product to room temperature.

No.

35 SKAU, Evald, L., Dopp, W. N., Burleigh, E. G., and Banowetz, L. F.

PHASE RELATIONS PERTAINING TO THE SOLVENT WINTERIZATION OF COTTONSEED AND PEANUT OILS IN ACETONE. Amer. Oil Chem. Soc. Jour. 27(12): 556-564. 1950.

Systematic physical chemical data on the solvent-winterization behavior of cottonseed and peanut oils with acetone have been obtained which should serve as a basis for selecting the conditions necessary for the effective solvent winterization of these oils in acetone. The two oils are only partially miscible with acetone below certain temperatures which have been determined. In peanut oil this phenomenon may interfere with the winterization process within a certain range of concentrations, but for cottonseed oil the separation into two liquid phases does not occur until some 5° C. below the temperature required for adequate winterization. Complete data for a 3-hour holding-time have been obtained for three cottonseed oils ranging in iodine value from 106.1 to 116.4. Tables and graphs have been constructed to show the effect of oil-solvent ratio, chilling temperature, holding-time, agitation, and iodine value of the original oil on the percentage of solid removed and on the degree of winterization and iodine value of the winterized oil. Similar data have been obtained for a refined peanut oil insofar as possible without interference from separation into two liquid phases. It seems probable that if acetone were used as the winterization solvent for peanut oil, the separation into two liquid layers and the sensitivity of this phenomenon to moisture might be a source of processing difficulties especially if filtration instead of centrifugation were used to separate the solid from the supernatant.

36 SPADARO, J. J., McCourtney, E. J., and Vix, H. L. E.

SOLVENT EXTRACTION OF COTTONSEED AND PEANUT OILS. VII. EFFECT OF DRYING FLAKED PRIME COTTONSEED ON COLOR OF OIL AND MEAL PROPERTIES. Amer. Oil Chem. Soc. Jour. 27(10): 394-396. 1950.

In an investigation of the effect of the heat in drying cottonseed flakes in preparation for solvent extraction on oil color and meal properties, prime cottonseed from the 1948 crop of New Roads, Louisiana, was used. The seed, which had been stored under favorable conditions, had 6.9 percent initial moisture content and 1.2 percent free fatty acid content. The results showed that, although the colors increased slightly with increased drying temperatures of the flakes, all of the oil colors were prime. This indicates that dark oils produced by solvent extraction from this lot of cottonseed are due to conditions other than flake drying temperatures. The investigation indicated that prime flakes can be dried

No.

at relatively high temperatures without affecting the protein solubility of the meal. Proper drying of flakes will aid in obtaining optimum solvent extraction conditions, such as percolation rate, extractability of flakes, and minimum fines.

37 SPADARO, J. J., Persell, R. M., Reuther, C. G., Jr., Vix, H. L. E., Laborde, E. J., Latham, J. W., Jaeger, R. L., Pollard, E. F., and Gastrock, E. A.

PILOT-PLANT FRACTIONATION OF COTTONSEED. III. PROCESS DEVELOPMENT OF DIFFERENTIAL SETTLING. Amer. Oil Chem. Soc. Jour. 27(9): 336-343. 1950.

Chemical engineering data are presented to show the pilot-plant process development of cottonseed fractionation employing the differential settling principle. The purpose of the process is to produce a cottonseed meal fraction essentially free of pigment glands and hulls, and a second fraction in which the pigment glands are concentrated sufficiently to serve as a raw material if pharmaceutical or other industrial use is developed for the glands or the pigments. The non-lipids fraction will make available a meal of high nutritive value and a source of industrial protein. Unit operations involved, including machinery and other equipment required, and proposed flow diagrams for commercial application are discussed.

38 STANSBURY, Mack F., Field, Elsie T., and Guthrie, John D.

THE TANNIN AND RELATED PIGMENTS IN THE RED SKINS (TESTA) OF PEANUT KERNELS. Amer. Oil Chem. Soc. Jour. 27(8): 317-321. 1950.

The red skins (testa) represent from 2.0 to 3.5 percent of peanut kernels and contain tannin and related pigments which will contribute to the presence of undesirable color in the protein preparations. An investigation of the character of the tannin and related pigments showed that the tannin is a catechol-type, the purified tannin representing about 7 percent of the weight of the skins. Much smaller quantities of phlobaphene and so-called "leuco-anthocyanic chromogen" were isolated from the skins. Some evidence of the presence of traces of a flavonic-type pigment was obtained. Spectrophotometric investigations indicated a close relationship of the first 3 pigments. The tannin when refluxed with alcoholic hydrochloric acid gave a water-soluble red pigment which appeared to have an oxonium-type structure. The elementary analyses and certain properties of the isolated tannin and related pigments were considerably different from those reported by previous investigators. The amorphous nature of these substances makes chemical investigation difficult.

No.

59 WARD, T. L., and Singleton, W. S.

THERMAL PROPERTIES OF FATS AND OILS. VII. HYDROGENATED AND UNHYDROGENATED PEANUT OILS. Amer. Oil Chem. Soc. Jour. 27(11): 423-426. 1950.

A refined and bleached peanut oil was examined calorimetrically before and after hydrogenation. Measurements were made over the entire range of melting, from completely solid to liquid. Values for the specific heats of the oils were used to develop equations relating temperature and specific heat of the oils in both solid and liquid states. The heat of fusion of both samples was also determined. The relative amounts of solid and liquid glycerides in hydrogenated and unhydrogenated peanut oil at various temperatures over their entire melting ranges were estimated from the calorimetric data.

See also Items Nos. 1, 3, and 5.

Sweetpotatoes

None.

PRESS NOTICES, RESEARCH ACHIEVEMENT SHEETS

Natural Rubber from Goldenrod Possible with New Process. Res. Achvt. Sheet 133(C). (Processed.) August 1950.

Collaborators to Evaluate Cotton Utilization Research Program. August 3. USDA 1852-50.

New Cotton-Opening Machine for Textile Mills Developed by USDA. September 4. USDA 2102-50.

New Fiber Cutter Extends Potential Uses for Cotton. Res. Achvt. Sheet 135(C). (Processed.) November 1950.

Army and USDA to Make World-Wide Tests of Anti-Mildew Treatment for Cotton. November 1. USDA 2563-50.

Vat-Dyed or Printed Cotton Fertilizer Bags Found to Have Same Re-Use Value as Flour and Feed Bags. November 1. USDA 2573-50.

Cellulose Expert to Collaborate With USDA Researchers in Expanding Cotton Uses. November 2. USDA 2581-50.

Modified Screw-Press Method Yields Superior Cottonseed Meal. November 13. USDA 2697-50.

Graduate Students Offered Research Internships Under USDA-College Plan. December 24. USDA 3014-50.

PATENTS

ARTHUR, Jett C., Jr.

PROCESS FOR THE MANUFACTURE OF PEANUT PROTEIN. U. S. Patent No. 2,529,477; Nov. 14, 1950.

A process of preparing a dense, heavy, protein curd having a relatively quick settling rate, comprising: preparing a water-peanut meal suspension in the weight ratio of 10 parts of water to 1 part of meal; adjusting the pH of the suspension to about 7.5 with sodium hydroxide to peptize the protein; removing the insoluble portion of the meal and washing it with water, which increases the ratio to 15 parts of water to 1 part of meal; introducing gaseous sulfur dioxide until the pH of the solution is about 4.5, the temperature during the introduction being maintained at 73° to 90° F., the rate of introduction of the sulfur dioxide gas being about 0.23 pound per minute per 100 pounds of peanut meal; and isolating the protein curd from the liquor by physical separation.

ARTHUR, Jett C., Jr.

STABILIZATION OF VISCOUS DISPERSIONS OF COTTONSEED PROTEINS. U. S. Patent No. 2,531,383; Nov. 28, 1950.

A process of stabilizing the viscosity of a dispersion of cottonseed proteins comprising: forming a mixture of the proteins, water, a reducing sugar, in the proportions of from 88 to 220 parts water and 0.45 to 4.5 parts reducing sugar per 22 parts of protein, and an alkali.

BURAS, Edmund M., Jr., and Reid, John David

LINE-OPERATED VACUUM TUBE VOLTMETER. U. S. Patent No. 2,513,281; July 4, 1950.

A stable alternating current-operated, continuous reading, vacuum tube voltmeter is described which is simply constructed and operated. It may be used as a titrimeter, a pH meter or a direct-current voltmeter. A calibration switch provides standard reference points for pH measurement. The range and sensitivity controls are independent of each other.

KYAME, G. J.

METHOD OF AND APPARATUS FOR PREPARATION AND DISTRIBUTION OF SIZING MATERIALS. U. S. Patent No. 2,516,884; Aug. 1, 1950.

An improved method for the preparation and distribution of sizing materials. The unit comprises a storage tank, pump, heat exchanger, and size box so connected that the pump draws fluid similtaneously from both storage tank and size box, and pumps it through the heat exchanger. The heat exchanger discharge is divided into two streams, one going back to the storage tank and the other to the size box. Both streams are made to agitate the contents of the respective tanks, no other means of agitation being needed. To make this method more easily applicable, a novel float-type valve which controls the rate of fluid withdrawal is used to maintain a constant fluid level in the size box.

REEVES, Richard E.

PRODUCTION OF IMPROVED CELLULOSIC MATERIAL. U. S. Patent No. 2,520,963; Sept. 5, 1950.

A method for producing improved cellulosic materials by treatment with alcohol is described. These materials, which have low viscosity and are suitable for chemical uses, are especially resistant to reagents, particularly alkalies. The treatment is termed "alcoholysis" or, more specifically, "methanolysis" or "ethanolysis," where the alcohols employed are methanol or ethanol. A cleavage of certain linkages in the cellulose molecule occurs so that a modified cellulose is formed, containing alcohol bound in chemical union so as to stabilize the aldehyde end group.

REPUBLICATIONS

None of previously listed articles.